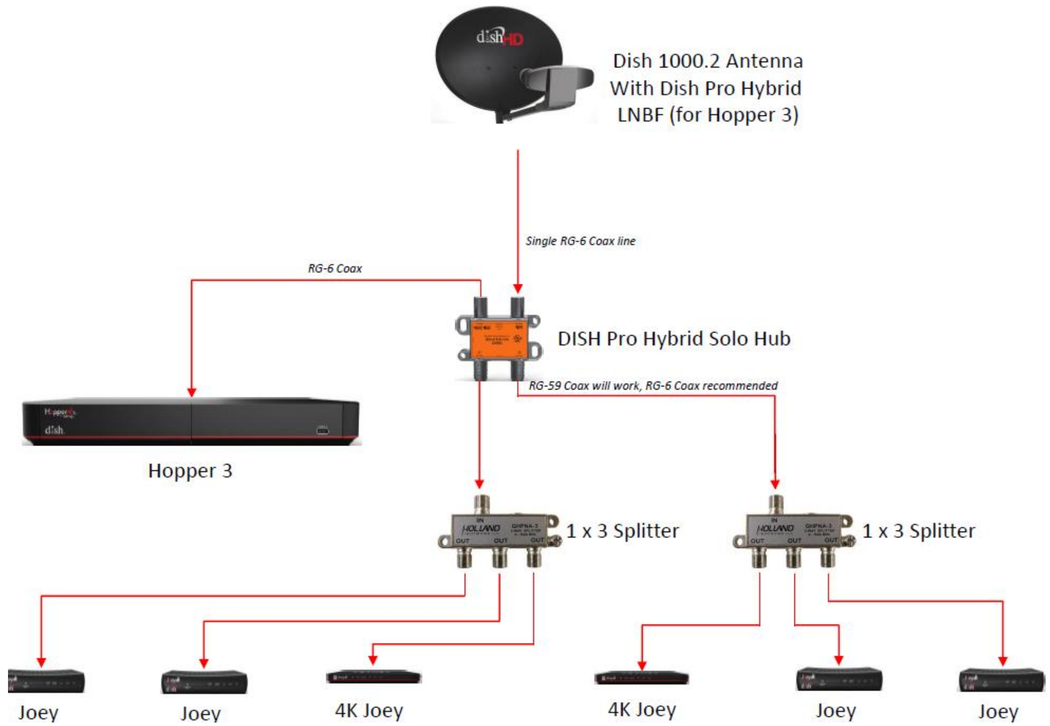
EXHIBIT J

U.S. Patent No. 8,631,450 ("the '450 Patent") Exemplary Infringement Chart

The Accused MoCA Instrumentalities are instrumentalities that DISH deploys to provide a whole-premises DVR network over an on-premises coaxial cable network, with DISH "Hopper" and "Joey" nodes operating with data connections compliant with MoCA 1.0, 1.1, and/or 2.0. The Accused MoCA Instrumentalities include the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, and DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and substantially similar instrumentalities. DISH literally and/or under the doctrine of equivalents infringes the claims of the '450 Patent under 35 U.S.C. § 271(a) by using the Accused MoCA Instrumentalities.

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
29. A broadcasting method within a Broadband Coaxial Network ("BCN"), comprising:	The Accused Services are provided using at least the Accused MoCA Instrumentalities including the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and devices that operate in a similar manner. The Accused MoCA Instrumentalities operate to form a broadband coaxial network over an on-premises coaxial cable network as described below. The DISH full-premises DVR network constitutes a broadband coaxial network as claimed. The DISH full-premises DVR network is a MoCA network created between at least one Hopper DVR and one or more Joey receivers using the on-premises coaxial cable network. This MoCA network is compliant with MoCA 1.0, 1.1, and/or 2.0. "The MoCA system network model creates a coax network which supports communications between a convergence layer in one MoCA node to the corresponding convergence layer in another MoCA node." (MoCA 1.0, Section 1. *See also* MoCA 1.1, Section 1.1; MoCA 2.0, Section 1.2.2)

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent
	“The MoCA Network transmits high speed multimedia data over the in-home coaxial cable infrastructure.” (MoCA 1.0, Section 2. *See also* MoCA 1.1, Section 2; MoCA 2.0, Section 5) “In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node.” (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1) DISH utilizes the MoCA standard to provide an on-premises DVR network over an on-premises coaxial cable network as described below:

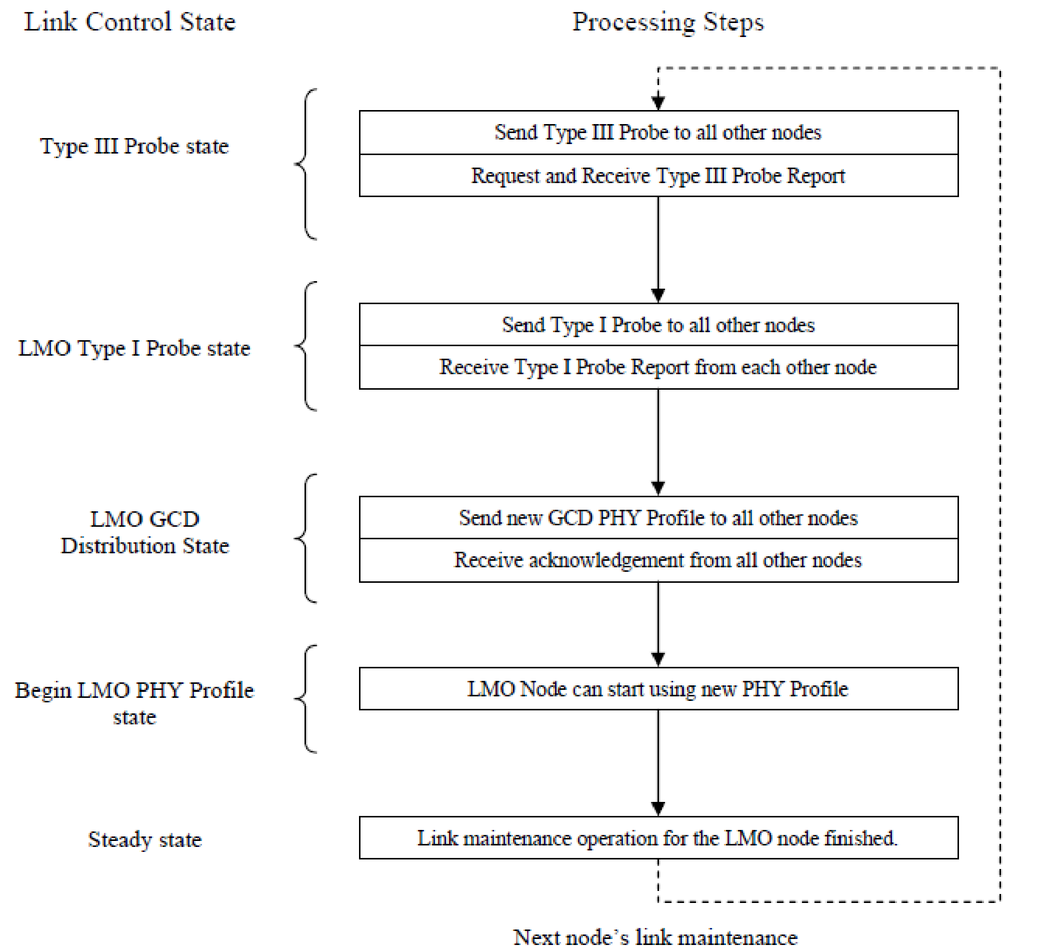
U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	 DISH PRO HYBRID SOLO HUB: This Solo Hub is a home video network device that combines multi-orbital coaxial cable satellite feeds from a DISH 1000.2 antenna or switch into a single-cable coaxial satellite feed to support MoCA networking for the Hopper 3 DVRs (host). The client ports are intended to feed up to 6 Joey client receivers (clients). The Solo Hub creates a MoCA video network for Hopper DVRs and Joeys. Rated 50 MHz to 3 GHz. SPLITTERS: 1 GHz common splitters can be used to feed Joey client receivers. HOPPER 3: The Hopper 3 is the revolutionary whole-home DVR from DISH that

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent
	includes 16 satellite tuners and a 2TB hard drive. JOEY: The Joey is the MoCA thin-client receiver that networks with the Hopper for viewing on additional TVs. 4K JOEY: The 4K Joey is an option for installation on additional 4K TVs. DISH PRO HYBRID 42 SWITCH: This switch allows two Hopper 3 DVRs to be installed using a single DISH traditional 1000.2 antenna. Each Hopper 3 forms its own MoCA video network with connected Joeys. The switch comes with a 110VAC power supply unit. Your new Hopper® 3 receiver is a Whole-Home HD DVR that offers full digital video recording functionality, including pausing live TV, to every TV in your house that is part of your Whole-Home DVR system. The Hopper 3 receiver is the hub for all things entertainment. It is an HD DVR that provides the equivalent of 16 tuners, allowing you to record multiple HD channels at once and at any time and play them back in any room in your home. Using the PrimeTime Anytime® feature, you can record up to six HD channels simultaneously (with your local ABC, CBS, FOX and NBC channels provided in HD, which may not be available in all markets). It is one HD DVR that works independently on as many as four different TVs at the same time, so everyone can be in different room watching their favorite TV programming. Joey® receivers (Joey®, SuperJoey®, Wireless Joey®, 4K Joey™) connect to other TVs in your home and link to the Hopper 3 system, creating a Whole-Home DVR network. It supports all of the features of the Hopper 3 (with the exception of Picture-In-Picture) and offers an identical user interface as the Hopper 3. You can connect a Joey receiver to a high-definition or standard-definition TV.

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	CONNECTING THE JOEY RECEIVER(S) This section describes how to connect the receiver's **HOME VIDEO NETWORK** connection to one or more cable-ready remote TV(s) located in other room(s) away from the Hopper. You can use these instructions to connect TVs in your home to see live and recorded programming from the Hopper. This installation uses your in-home coaxial cable system. If your home does not have built-in cabling, it will be necessary to run these cables from the Hopper HD DVR to each Joey Receiver conected to a remote TV. Due to the potential complexity of this installation, you should have this professionally installed. Call the DISH Customer Service Center at 1-800-333-DISH (3474) for more information. If you need another remote control, be sure to order the replacement remote control kit for Hopper and Joey that uses UHF-2G signals. Call your DISH retailer, or visit www.mydish.com online, select Upgrades, then Products, and click on Remote & Accessories. 1 Connect the **HOME VIDEO NETWORK** output on the back of the Hopper HD DVR to an existing wall cable outlet using a coaxial cable. 2 Connect the Joey Receiver(s) in other room(s) to existing wall cable outlet(s) using coaxial cable(s). 3 Connect the Joey Receiver(s) to an audio/video input of the remote TV in each room. • If it is a high-definition TV or monitor and an HDMI connection is available on the remote TV, use a single HDMI cable from the output on the back of the Joey Receiver to provide high-quality audio and HD/SD video. See page 94. • If it is a standard-definition TV or an HDMI connection is not available on the remote TV, use composite (yellow) video and stereo audio cables from the outputs on the back of the Joey Receiver. See page 95. 4 Turn on every Joey Receiver and remote TV connected to the in-home cabling system. If you have not already done so, you may need to pair a remote control to each Joey. 5 Follow the on-screen prompts or included instructions for linking each Joey Receiver to your Hopper HD DVR. (The Hopper is the host for DISH Whole-Home DVR services.) 6 Confirm that you see a picture from your Joey Receiver(s) on your remote TV(s). • If your picture looks good, then you are finished with this procedure. • If your TVs do not display a picture or if the picture is not as clear as you would like it to be, repeat the steps to confirm all the connections. Coaxial connections should be hand-tightened.

U.S. Patent No. 8,631,450	**The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent**
a transmitting node transmitting a probe signal to a plurality of receiving nodes;	The Accused MoCA Instrumentalities include a transmitting node transmitting a probe signal to a plurality of receiving nodes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a transmitting node transmitting a probe signal to a plurality of receiving nodes. “While it is physically a shared medium, the logical network model is a fully meshed collection of point-to-point links, each with its own unique channel characteristics and channel capacity. MoCA devices use optimized PHY parameters between every point to point link. Each set of optimized PHY parameters is called a PHY Profile. Because each link is unique, it is critical that all nodes know the source and the destination for every transmission.” (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2; MoCA 2.0, Section 1.2.2) “A variety of physical layer frequency-domain and time-domain probes are used to create modulation profiles, optimize performance, and allow for various calibration mechanisms. Type I Modulation Profile Probes are frequency domain probes used to determine modulation profiles of the channel between any two nodes. Type II Probes are frequency domain probes consisting of two tones that may be used to fine tune performance. A Type III Echo Profile Probe may be used to determine the impulse response of the channel. This information can be used to optimize various physical layer parameters. In addition to the above probes, this specification provides opportunities for various unique Loopback Transmissions which may be useful for RF calibration, among other things.” (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2)

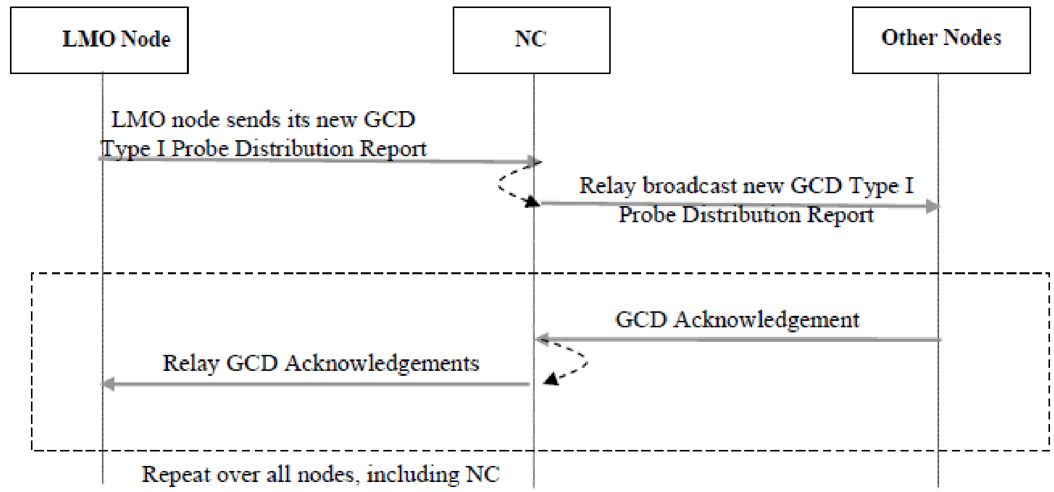
U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent
	“LMO is the process by which MoCA nodes periodically update transmit power levels and PHY profiles. The LMO operation MUST be performed as follows: (1) NC selects a node to be the “LMO node”, (2) All nodes participate in the signal exchanges specified in this section for completing LMO of the LMO node. (3) NC selects the next node for LMO and the process is repeated.” (MoCA 1.0, Section 3.7. *See also* MoCA 1.1, Section 3.7; MoCA 2.0, Section 8.9) “The NC MUST indicate the beginning of the LMO signal exchange for a node by indicating the Link Control State “Type III Probe” (LINK_STATE = 0x07) and by setting LMO_NODE field of asynchronous MAPs to the Node ID of the LMO Node. The LMO_DESTINATION_NODE should always be set to 0x3F. Subsequently, all nodes MUST follow signal exchanges defined in this section.” (MoCA 1.0, Section 3.7. *See also* MoCA 1.1, Section 3.7; MoCA 2.0, Section 8.9) “As shown in Figure 3-11, the first state for the LMO of a node is the Type III Probe State. In this Link Control state, the LMO node transmits Type III Probes to all other nodes and receives reports back from them. This state is followed by the LMO Type I Probe state. In this Link Control state, the LMO node transmits Type I Probes to all other nodes and receives Type I Probe Reports back from them. The next Link Control state is the LMO GCD Distribution state. In this state, the LMO node sends the newly computed GCD PHY Profile to all other nodes and receives acknowledgements back from them. The next Link Control state is the Begin LMO PHY Profile state. The LMO node can begin using its new PHY Profile after the NC indicates this state in asynchronous MAPs.” (MoCA 1.0, Section 3.7.1. See also MoCA 1.1, Section 3.7.1; MoCA 2.0, Section

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	8.9)  **Figure 3-11. Link Control States during LMO**

314607080.2

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	(MoCA 1.0, Figure 3-11. See also MoCA 1.1, Figure 3-14; MoCA 2.0, Section 8.9) "Probe – A signal transmitted by a MoCA node and received by the same or another node for improving or maintaining PHY performance of inter-node links." (MoCA 1.0, Section 1.2. See also MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "The MoCA physical layer (PHY) utilizes a modulation technique named Adaptive Constellation Multi-tone (ACMT). ACMT is a variation of orthogonal frequency division multiplexing (OFDM) where knowledge of the channel is used to pre-equalize all signals using variable bitloading on all subcarriers. The term used to describe the bitloading of the ACMT subcarriers is "modulation profile" and the process of creating a modulation profile between a node pair is called "modulation profiling". During periodic modulation profiling, probes are sent between all nodes and analyzed. After probe analysis, modulation profiles are chosen to optimize individual link throughput while maintaining a low packet error rate (PER). For each active ACMT subcarrier, the QAM constellation can vary from 1 to 8 bits per symbol (BPSK through 256QAM). Individual subcarriers can also be turned off. As a result, the number of bits per ACMT symbol varies as a function of the channel path." (MoCA 1.0, Section 2.2. See also MoCA 1.1, Section 2.2; MoCA 2.0, Section 5)
the transmitting node receiving a plurality of response signals comprising a plurality of bit-loading modulation schemes from the plurality of receiving nodes, wherein each of the plurality of receiving nodes	The Accused MoCA Instrumentalities include the transmitting node receiving a plurality of response signals comprising a plurality of bit-loading modulation schemes from the plurality of receiving nodes, wherein each of the plurality of receiving nodes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that receive a plurality of response signals comprising a plurality of bit-loading modulation

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	schemes from the plurality of receiving nodes, wherein each of the plurality of receiving nodes. "As described above, certain transmissions of probes are mandated by this specification. The information obtained from analyzing the probe packets at the receiver is used to determine various PHY parameters, such as Modulation Profile and cyclic prefix length for each link and channel. The link layer communicates the computed PHY parameters to other nodes according to the MAC specification." (MoCA 1.0, Section 4.5. *See also* MoCA 1.1, Section 4.5, MoCA 2.0, Section 8.9) "When NC receives indication by all other nodes in the network (including LMO node) in their reservation request (NEXT_LINK_STATE = 0x9) that they have finished signal exchanges of the previous state, NC MUST begin advertising LMO GCD Distribution state. This state is indicated by value 0x09 in the Asynchronous MAPs. When the LMO node receives Type I Probe Reports from all other nodes, it must re-calculate its GCD PHY Profiles and send back to all other nodes. Signals exchanged in this state are shown in Figure 3-14." (MoCA 1.0, Section 3.7.4. *See also* MoCA 1.1, Section 3.7.4; MoCA 2.0, Section 8.9)

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	 **Figure 3-14. Messages Exchanged During GCD Distribution State** (MoCA 1.0, Figure 3-14. *See also* MoCA 1.1, Figure 3-18, MoCA 2.0, Section 8.9)
receives the probe signal through a corresponding channel path,	The Accused MoCA Instrumentalities are operable to receive the probe signal through a corresponding channel path as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that receive the probe signal through a corresponding channel path. "Once the Link Control state is advanced to the LMO Type I Probe state, the LMO node MUST request bandwidth to transmit N12 Type I Probes to each node (including the NC). For scheduling the transmission of the Type I Probes, the LMO node MUST request transmission time of 11404 SLOT_TIMEs8. The N12 Type I Probes MUST be transmitted consecutively to one node before transmitting to

314607080.2

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	another node. […] During LMO, Nodes MUST be able to receive and process Type I probe transmissions that are at least T23 apart." (MoCA 1.0, Section 3.7.3.2. *See also* MoCA 1.1, Section 3.7.3.2, MoCA 2.0, Section 8.9) "Following Type I Probe transmissions, the LMO node MUST request a Type I Probe Report from all other nodes. When the LMO node is not the NC, it MUST send a Type I Probe Report Request to the NC for the NC to broadcast it to the other nodes in the network. When the LMO node is the NC, it MUST broadcast Type I Probe Report Requests to all the nodes." (MoCA 1.0, Section 3.7.3.3. *See also* MoCA 1.1, Section 3.7.3.3, MoCA 2.0, Section 8.9) "When an EN receives the Type I Probe Report request, relayed via the NC, the EN MUST send a report back using Type I Probe Report MAC Frame (format shown in Table 3-9). The EN MUST send this report to the NC with a request to relay the report to the LMO node (by setting RELAY_FLAG to '1')." (MoCA 1.0, Section 3.7.3.5. *See also* MoCA 1.1, Section 3.7.3.5, MoCA 2.0, Section 8.9) "Probe – A signal transmitted by a MoCA node and received by the same or another node for improving or maintaining PHY performance of inter-node links." (MoCA 1.0, Section 1.2. See also MoCA 1.1, Section 1.2, MoCA 2.0, Section 3)
determines transmission characteristics of the corresponding channel path,	The Accused MoCA Instrumentalities are operable to determine transmission characteristics of the corresponding channel path as described below.

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent
	For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine transmission characteristics of the corresponding channel path. “The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report.” (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7)

<table>
<tr><th>U.S. Patent No. 8,631,450</th><th>The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent</th></tr>
<tr><td></td><td>

Table 3-27. Type I Probe Report Calculated Parameters

Parameter	Explanation
PREAMBLE_TYPE	Preamble Type P3 or P4 (see Section 4.4.2). Selection is based on channel conditions. For MAP elements, this field is Reserved.
BITS_PER_ACMT_SYMBOL	The total number of bits per ACMT symbol, calculated from the Modulation Profile.
CHANNEL_USABLE	Defines if the bandwidth passes the Admission Limit (Section 8.1.5) during Admission or Minimum Link Throughput (Section 8.1.6) during LMO.
CP_LENGTH	Cyclic Prefix length to be used in future unicast transmissions. May also used to calculate the CP length for GCD transmissions.
TPC_BACKOFF_MAJOR	Outer Loop Power Control backoff
TPC_BACKOFF_MINOR	Outer Loop Power Control backoff
SC_MOD	Modulation Profile

(MoCA 1.0, Table 3-27. *See also* MoCA 1.1, Table 3-33, MoCA 2.0, Table 6-32)</td></tr>
<tr><td>determines a bit-loading modulation scheme for the corresponding channel path based on the transmission characteristics, and</td><td>The Accused MoCA Instrumentalities are operable to determine a bit-loading modulation scheme for the corresponding channel path based on the transmission characteristics as described below.

For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine a bit-loading modulation scheme for the corresponding channel path based on the</td></tr>
</table>

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	transmission characteristics. "PHY Profile – A set of parameters that defines the modulation between two nodes, including the preamble type, Cyclic Prefix length, Modulation Profile, and transmit power." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Broadcast Bit Loading (BBL) – This transmission format is used by each node when transmitting simultaneously to all nodes in the network. The transmission format is derived by each transmitting node to be the common set of transmission parameters based on unicast transmission format from the transmitting node to each other node in the network." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Greatest Common Density (GCD) - A modulation format computed by a node for transmission to multiple recipient nodes. For the GCD format, the modulation density used for each subcarrier is chosen to be the greatest possible constellation density that is less than or equal to the constellation density for that subcarrier as reported in the most recent Type I Probe Report the node sent to each of the other nodes in which the node indicated CHANNEL_USABLE = 0x01." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY

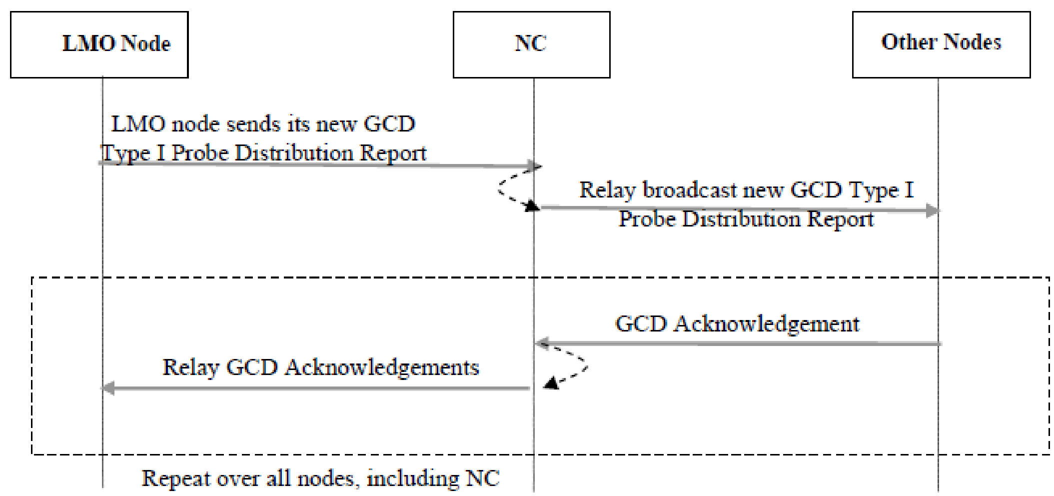
U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1) "A receiving node processes this [Type I: Modulation Profile Probe] to generate a modulation profile of QAM constellations. The modulation profile is transmitted back to the node that generated the probe so that the node knows which modulation profile to select when transmitting to that receiving node (for a description of PHY probe processing by the MAC see Section 3.13)." (MoCA 1.0, Section 4.5.1. *See also* MoCA 1.1, Section 4.5.1, MoCA 2.0, Section 8.3.4.1.10) "The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32)
transmits a response signal to the transmitting node informing the transmitting node of the bit-loading modulation scheme for the corresponding channel path;	The Accused MoCA Instrumentalities are operable to transmit a response signal to the transmitting node informing the transmitting node of the bit-loading modulation scheme for the corresponding channel path as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	Instrumentalities include circuitry and/or associated software modules that transmit a response signal to the transmitting node informing the transmitting node of the bit-loading modulation scheme for the corresponding channel path. "As described above, certain transmissions of probes are mandated by this specification. The information obtained from analyzing the probe packets at the receiver is used to determine various PHY parameters, such as Modulation Profile and cyclic prefix length for each link and channel. The link layer communicates the computed PHY parameters to other nodes according to the MAC specification." (MoCA 1.0, Section 4.5. *See also* MoCA 1.1, Section 4.5, MoCA 2.0, Section 8.9) "When an EN receives the Type I Probe Report request, relayed via the NC, the EN MUST send a report back using Type I Probe Report MAC Frame (format shown in Table 3-9). The EN MUST send this report to the NC with a request to relay the report to the LMO node (by setting RELAY_FLAG to '1')." (MoCA 1.0, Section 3.7.3.5. *See also* MoCA 1.1, Section 3.7.3.5, MoCA 2.0, Section 8.9) "The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7)
the transmitting node comparing the plurality of bit-loading modulation schemes to	The Accused MoCA Instrumentalities are operable to compare the plurality of bit-loading modulation schemes to determine a common bit-loading modulation scheme

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
determine a common bit-loading modulation scheme; and	as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that compare the plurality of bit-loading modulation schemes to determine a common bit-loading modulation scheme. "The topology of the in-home coax typically results in a multi-path delay profile. Because the echoes can be stronger and/or weaker than the original signal, depending on the output port-to-output port isolation of the jumped splitter, the channel is said to have either pre- or post-echoes, respectively. A zero decibel echo, i.e., equal power to the main path, leads to deep nulls in the frequency domain spectrum. In order to achieve target packet error rates of less than 10-5 for large packets (>1500 bytes) with no retransmissions, the MoCA physical layer uses channel pre-equalization (using bit loading) and multi-tone modulation on all links." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2) "ACMT is a variation of orthogonal frequency division multiplexing (OFDM) where knowledge of the channel is used to pre-equalize all signals using variable bitloading on all subcarriers. The term used to describe the bitloading of the ACMT subcarriers is "modulation profile" and the process of creating a modulation profile between a node pair is called "modulation profiling". During periodic modulation profiling, probes are sent between all nodes and analyzed. After probe analysis, modulation profiles are chosen to optimize individual link throughput while maintaining a low packet error rate." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5)

U.S. Patent No. 8,631,450	**The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent**
	"The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7) "The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32) "PHY Profile – A set of parameters that defines the modulation between two nodes, including the preamble type, Cyclic Prefix length, Modulation Profile, and transmit power." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Broadcast Bit Loading (BBL) – This transmission format is used by each node when transmitting simultaneously to all nodes in the network. The transmission format is derived by each transmitting node to be the common set of transmission parameters based on unicast transmission format from the transmitting node to each other node in the network."

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	(MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Greatest Common Density (GCD) - A modulation format computed by a node for transmission to multiple recipient nodes. For the GCD format, the modulation density used for each subcarrier is chosen to be the greatest possible constellation density that is less than or equal to the constellation density for that subcarrier as reported in the most recent Type I Probe Report the node sent to each of the other nodes in which the node indicated CHANNEL_USABLE = 0x01." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1)
the transmitting node transmitting a broadcast signal relaying the common bit-loading modulation scheme to the plurality of receiving nodes.	The Accused MoCA Instrumentalities are operable to transmit a broadcast signal relaying the common bit-loading modulation scheme to the plurality of receiving nodes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that transmit a broadcast signal relaying the common bit-loading modulation scheme to the

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the ’450 Patent
	plurality of receiving nodes. “When NC receives indication by all other nodes in the network (including LMO node) in their reservation request (NEXT_LINK_STATE = 0x9) that they have finished signal exchanges of the previous state, NC MUST begin advertising LMO GCD Distribution state. This state is indicated by value 0x09 in the Asynchronous MAPs. When the LMO node receives Type I Probe Reports from all other nodes, it must re-calculate its GCD PHY Profiles and send back to all other nodes. Signals exchanged in this state are shown in Figure 3-14.” (MoCA 1.0, Section 3.7.4. *See also* MoCA 1.1, Section 3.7.4; MoCA 2.0, Section 8.9)  **Figure 3-14. Messages Exchanged During GCD Distribution State** (MoCA 1.0, Figure 3-14. *See also* MoCA 1.1, Figure 3-18, MoCA 2.0, Section 8.9)

U.S. Patent No. 8,631,450	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 29 of the '450 Patent
	"After the LMO node has received acknowledgments from all nodes, it MUST advance its LINK_STATE field to "Begin LMO PHY Profile" state. When the NC receives the updated LINK_STATE indication from all other nodes in the network, it MUST advance the Link Control state of the network to "Begin LMO PHY Profile" state. When the LMO node receives this Link Control state indication, it can begin using newly computed PHY profiles (including transmit power settings) as described in Section 3.13.3." (MoCA 1.0, Section 3.7.5. See also MoCA 1.1, Section 3.7.5; MoCA 2.0, Section 8.9)